

# **Status and Importance of Long-Term Water-Level Monitoring**

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**Advisory Committee on Water Information**

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# Outline

- Why long-term water-level data are important
- Current status of water-level monitoring in U.S.
- Future needs and directions

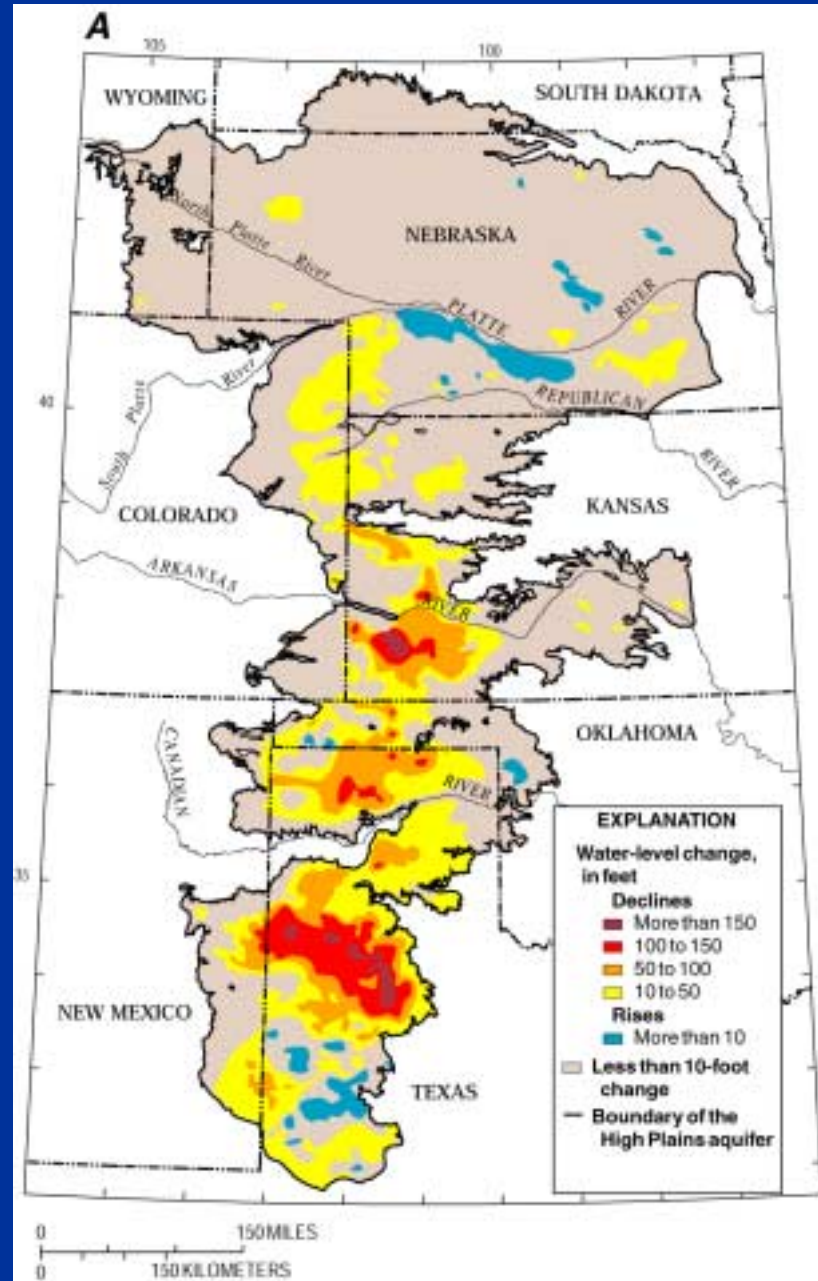


# Why long-term water-level data?

- Principal source of information about hydrologic stresses affecting groundwater recharge, storage, and discharge
- Water-level data collected over one or more decades are required to compile record of water-level fluctuations and to track trends with time

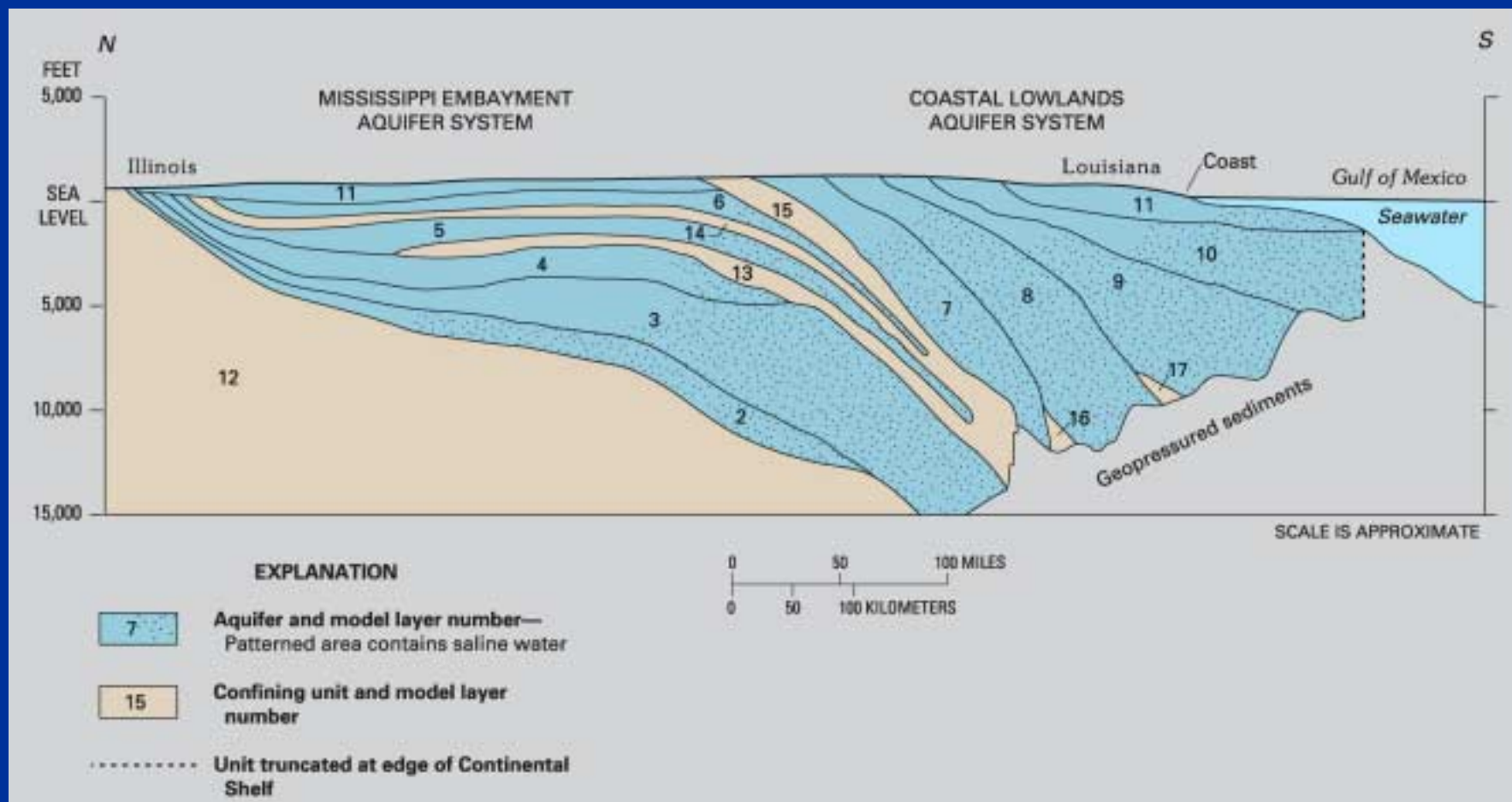


# High Plains Aquifer

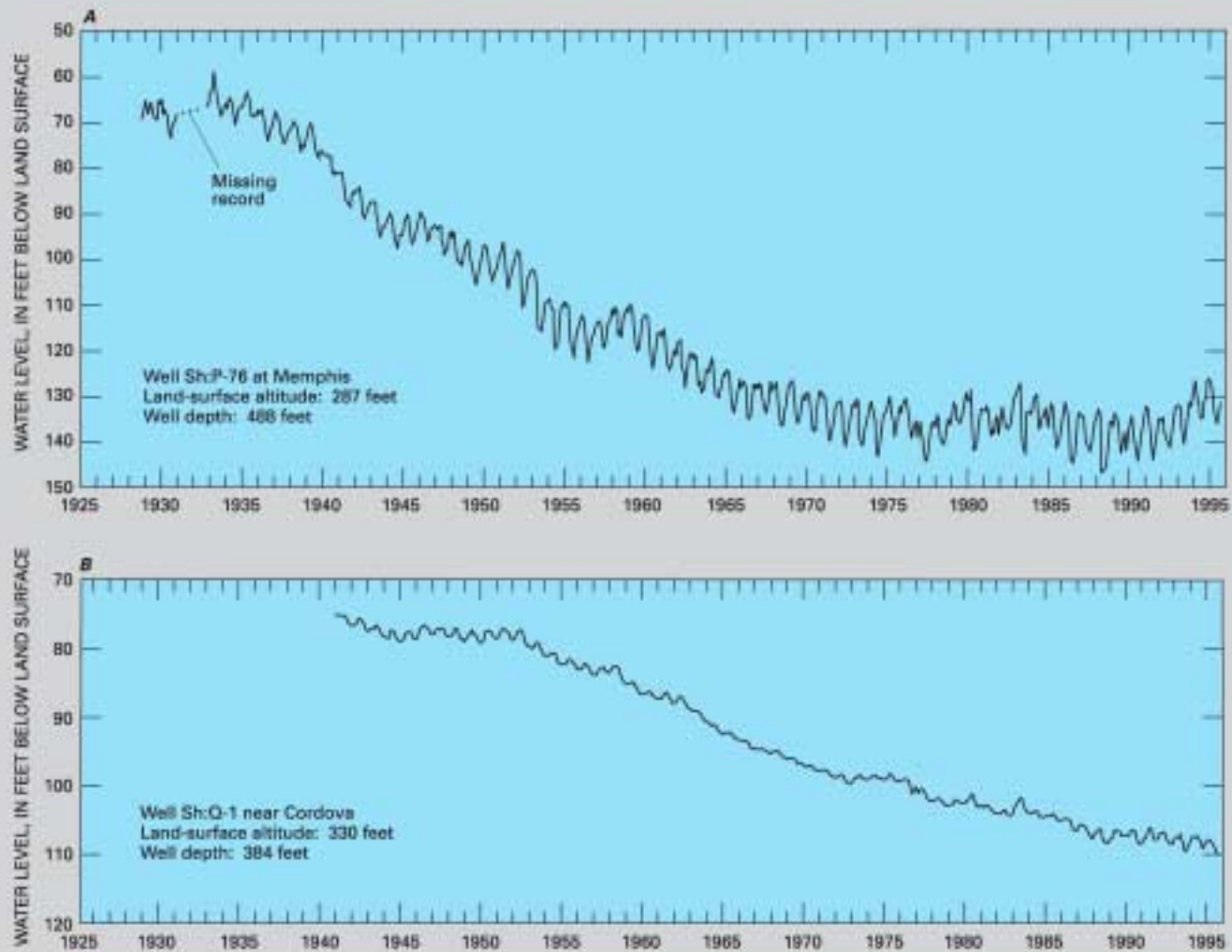


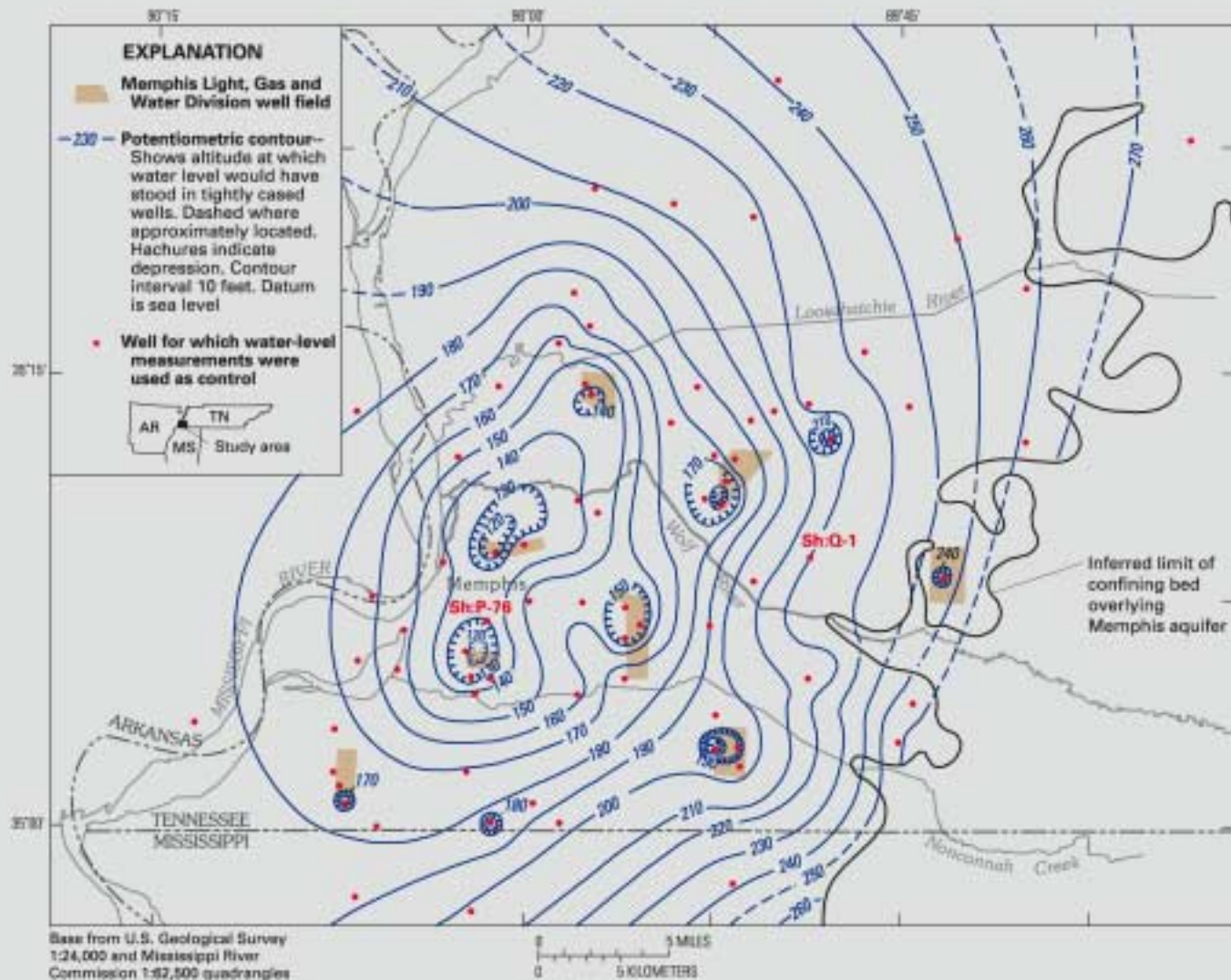


# Gulf Coastal Plain Aquifer System

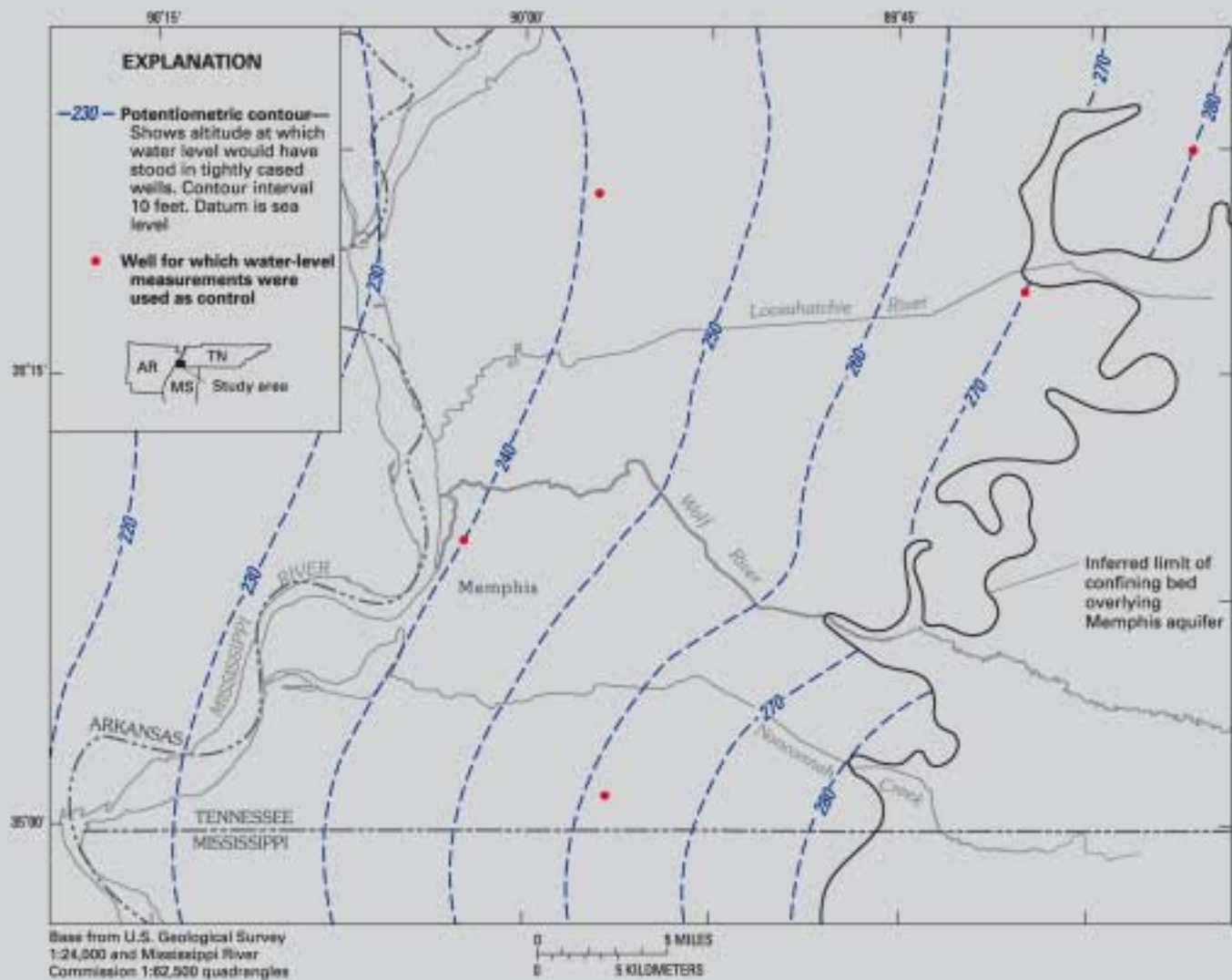


# Memphis, Tennessee

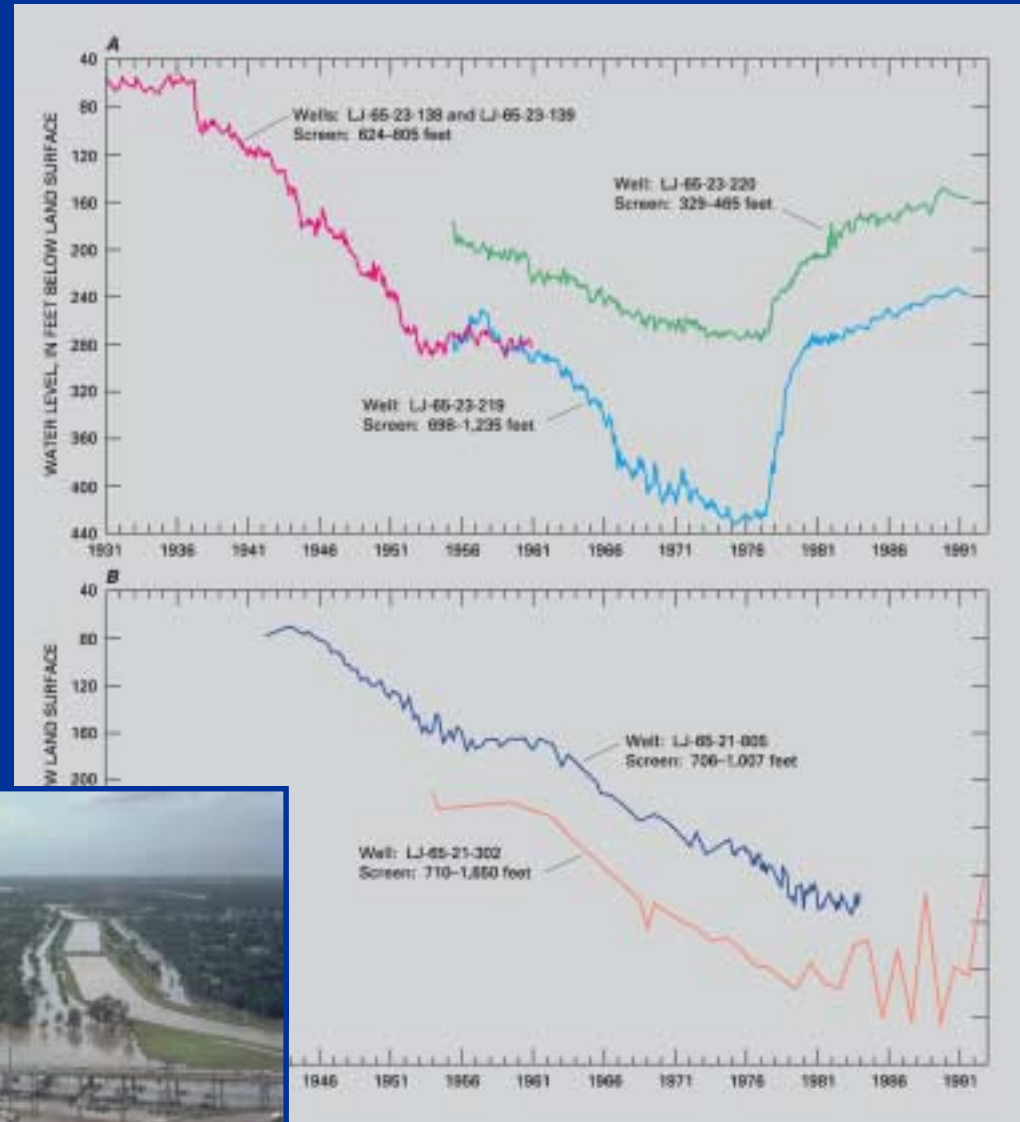




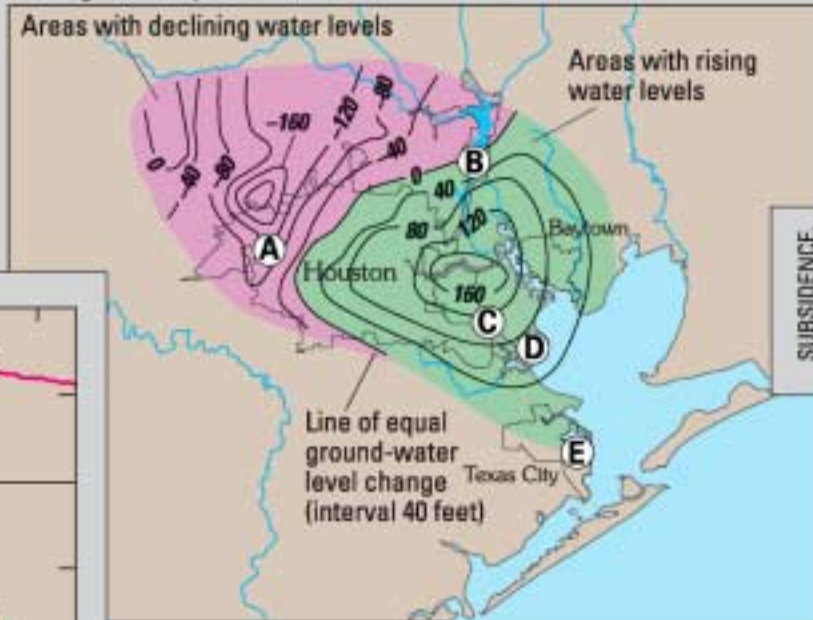




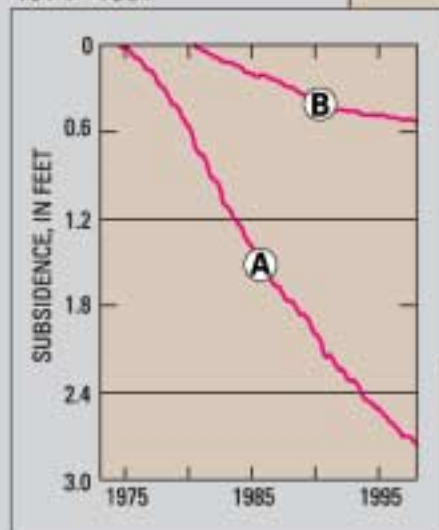
# Houston, Texas



Change in ground-water levels in wells in the Evangeline aquifer, 1977–1997



Continuing subsidence  
1974–1997



Some arrested subsidence  
1974–1997

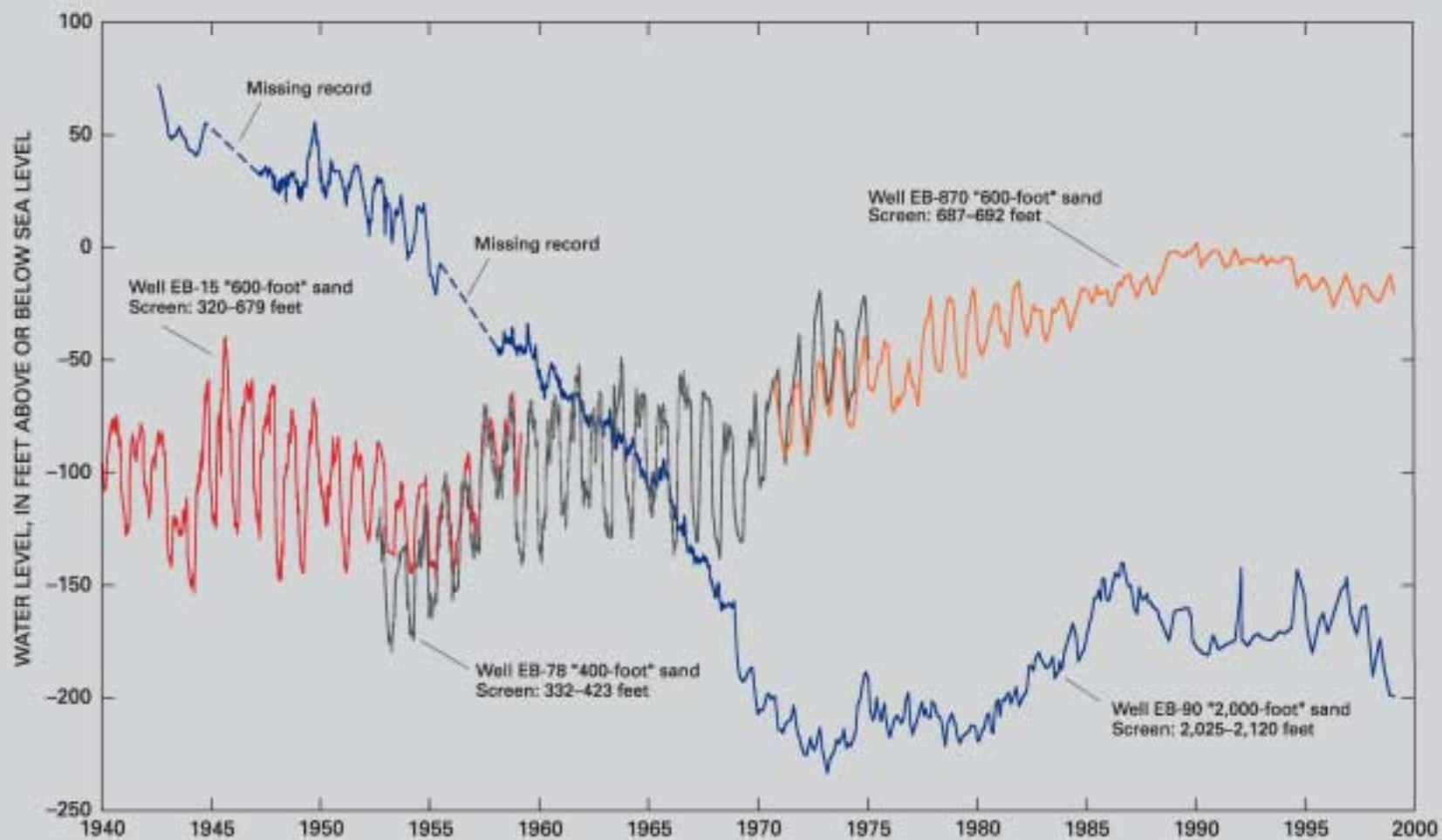


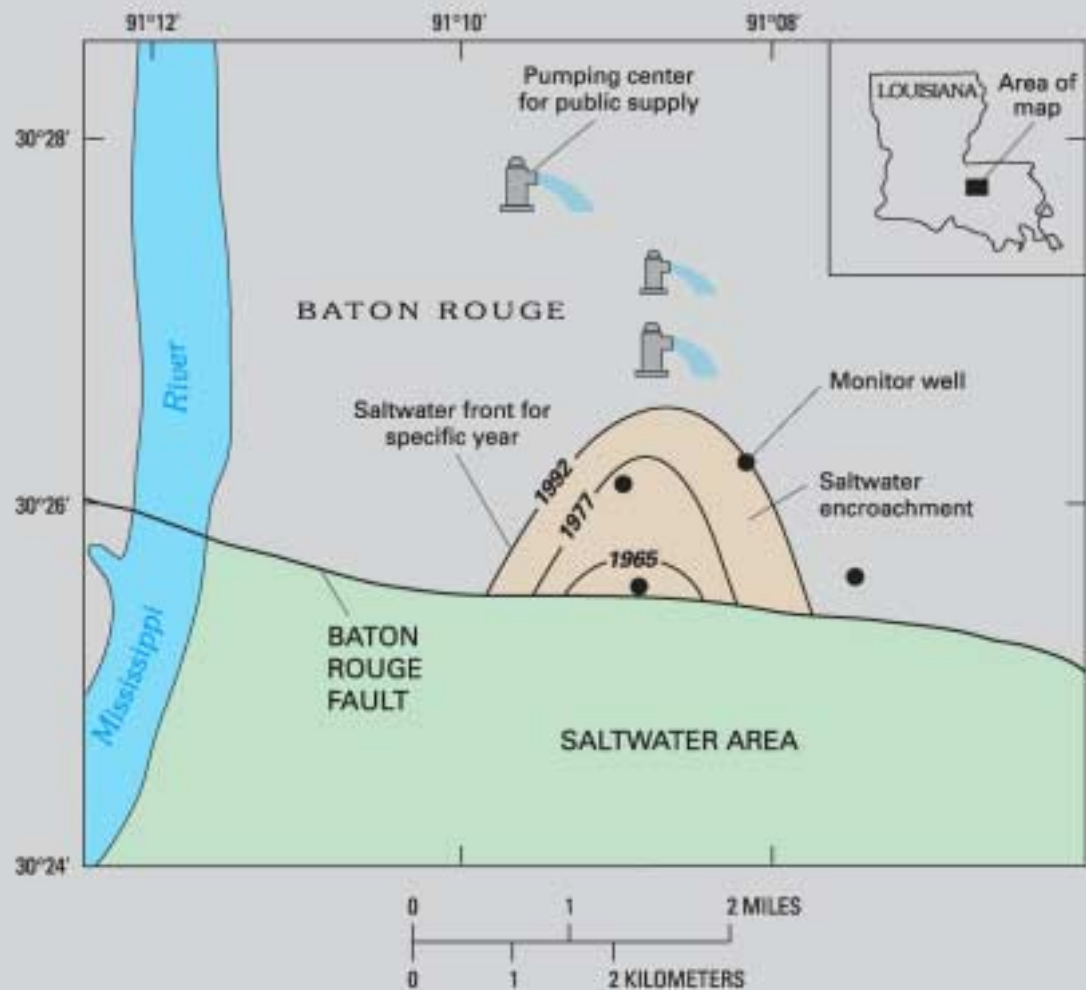
EXPLANATION

Extensometer sites for  
measuring subsidence

- (A) Addicks
- (B) Lake Houston
- (C) Baytown
- (D) Clear Lake
- (E) Texas City

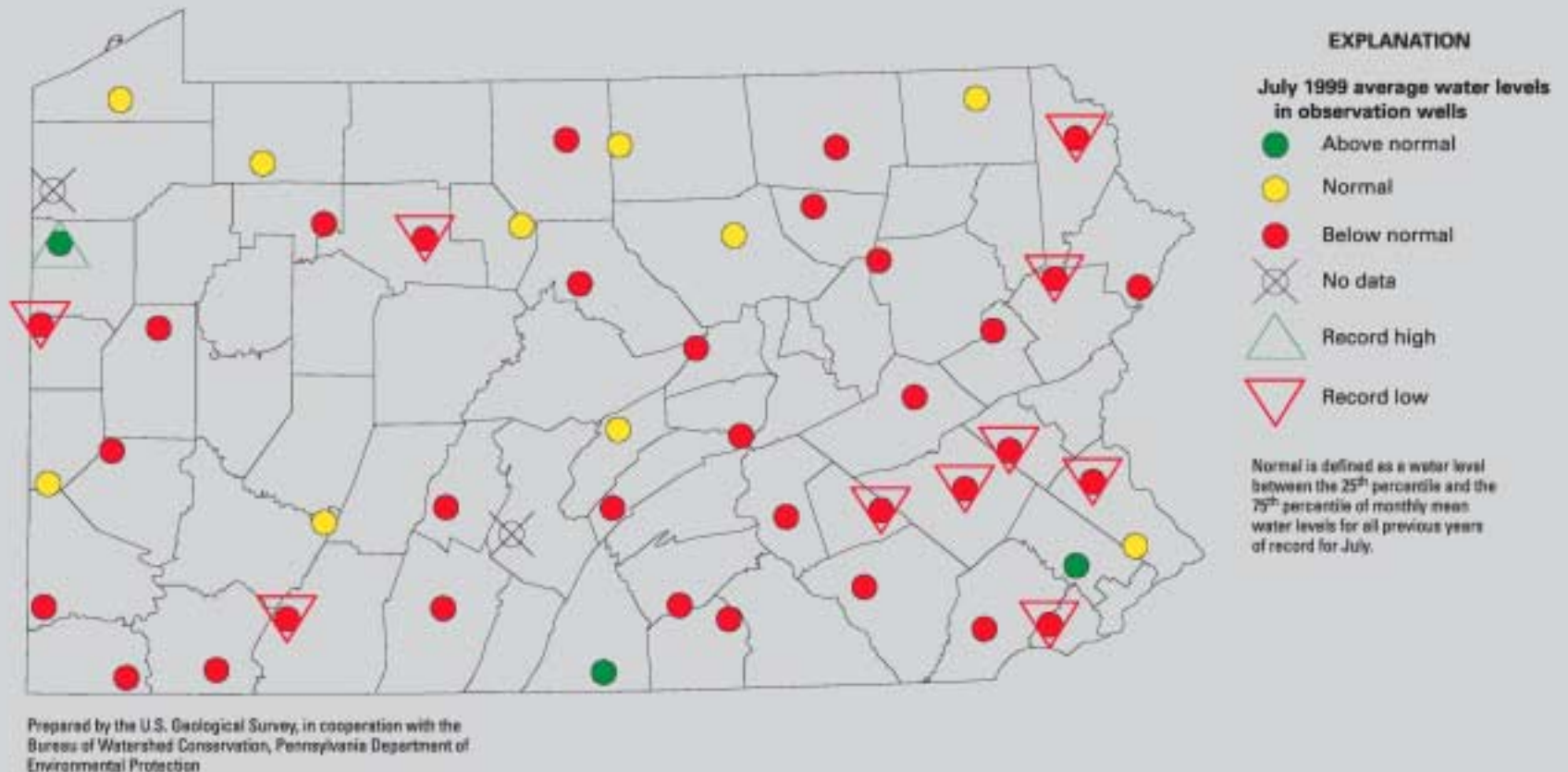
# Baton Rouge, Louisiana

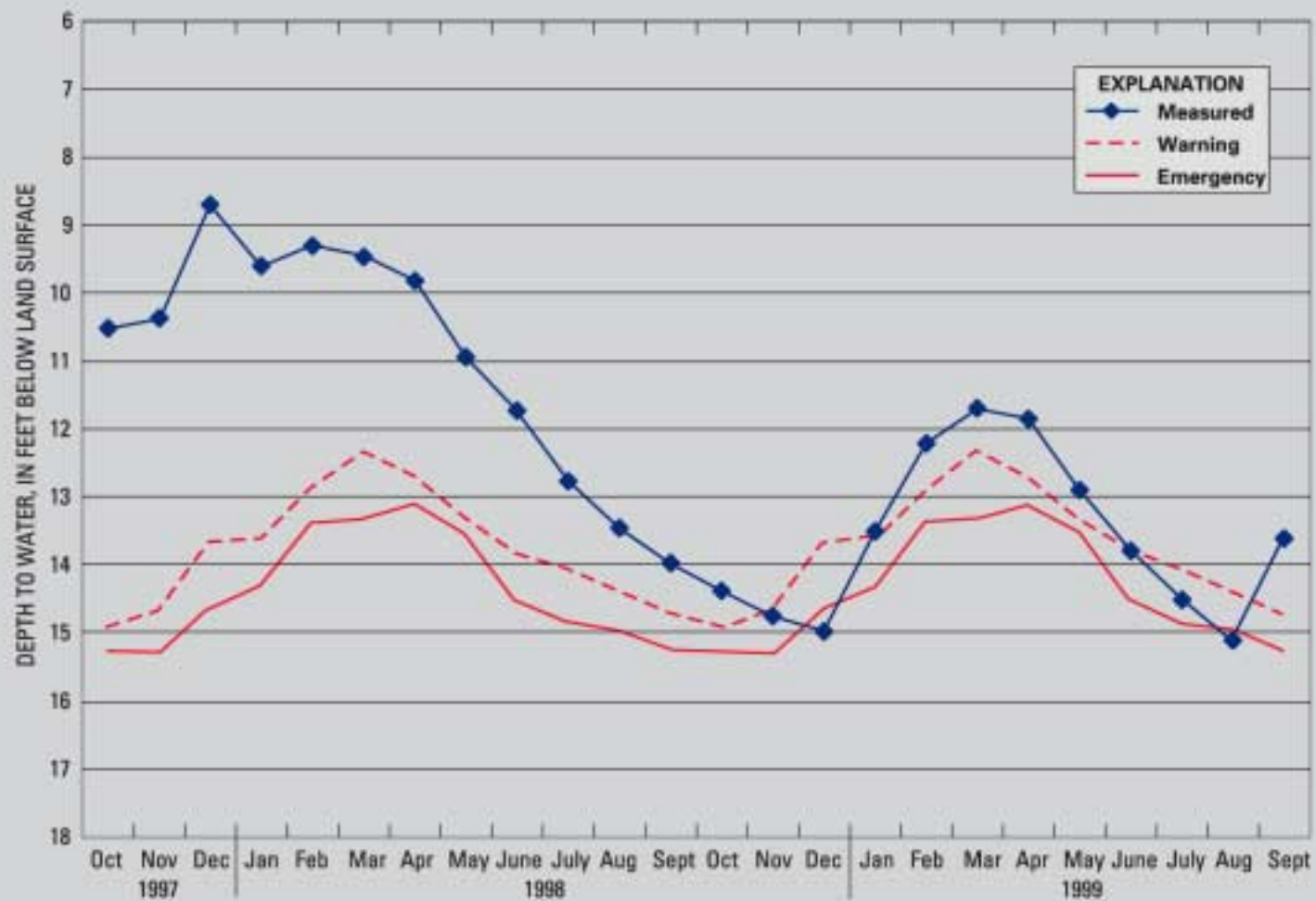




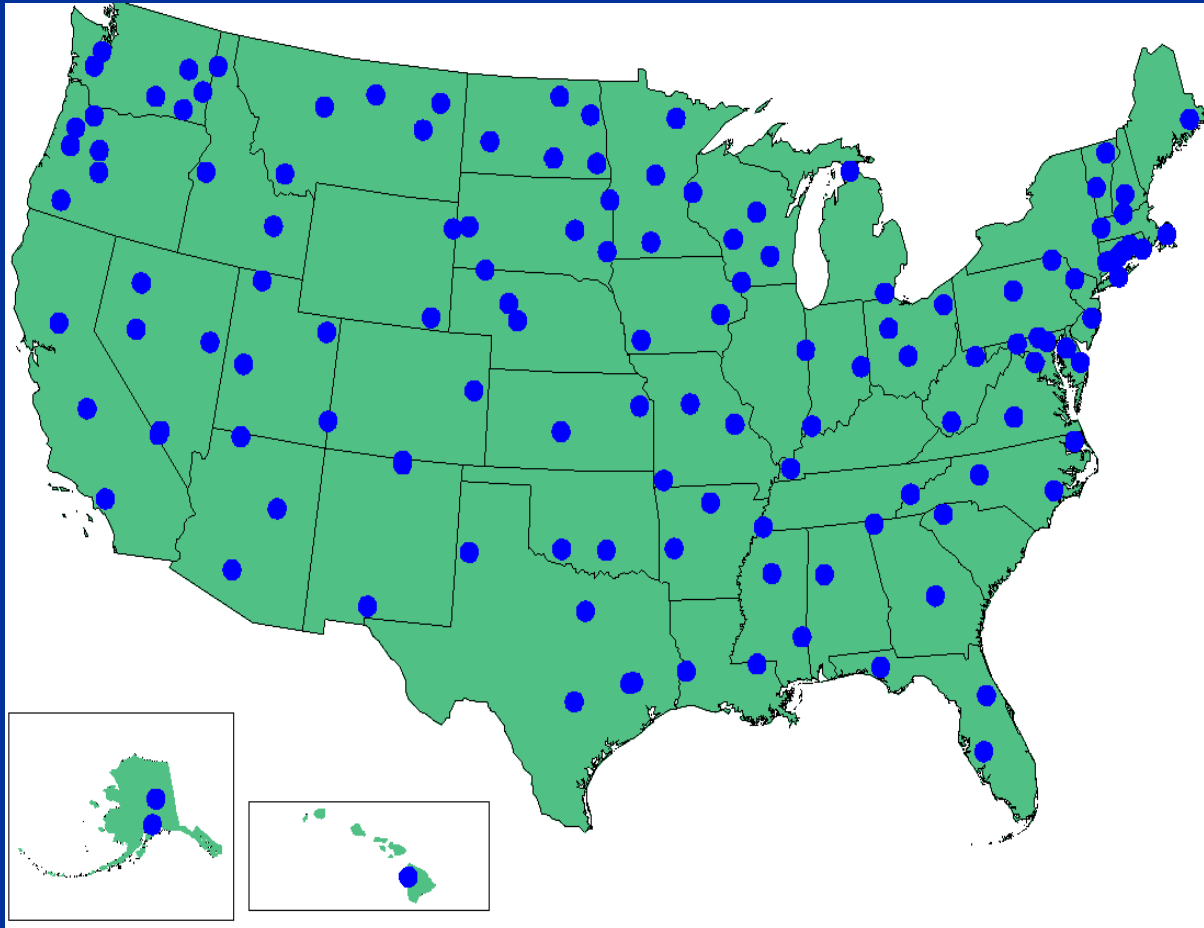


# Drought in Pennsylvania

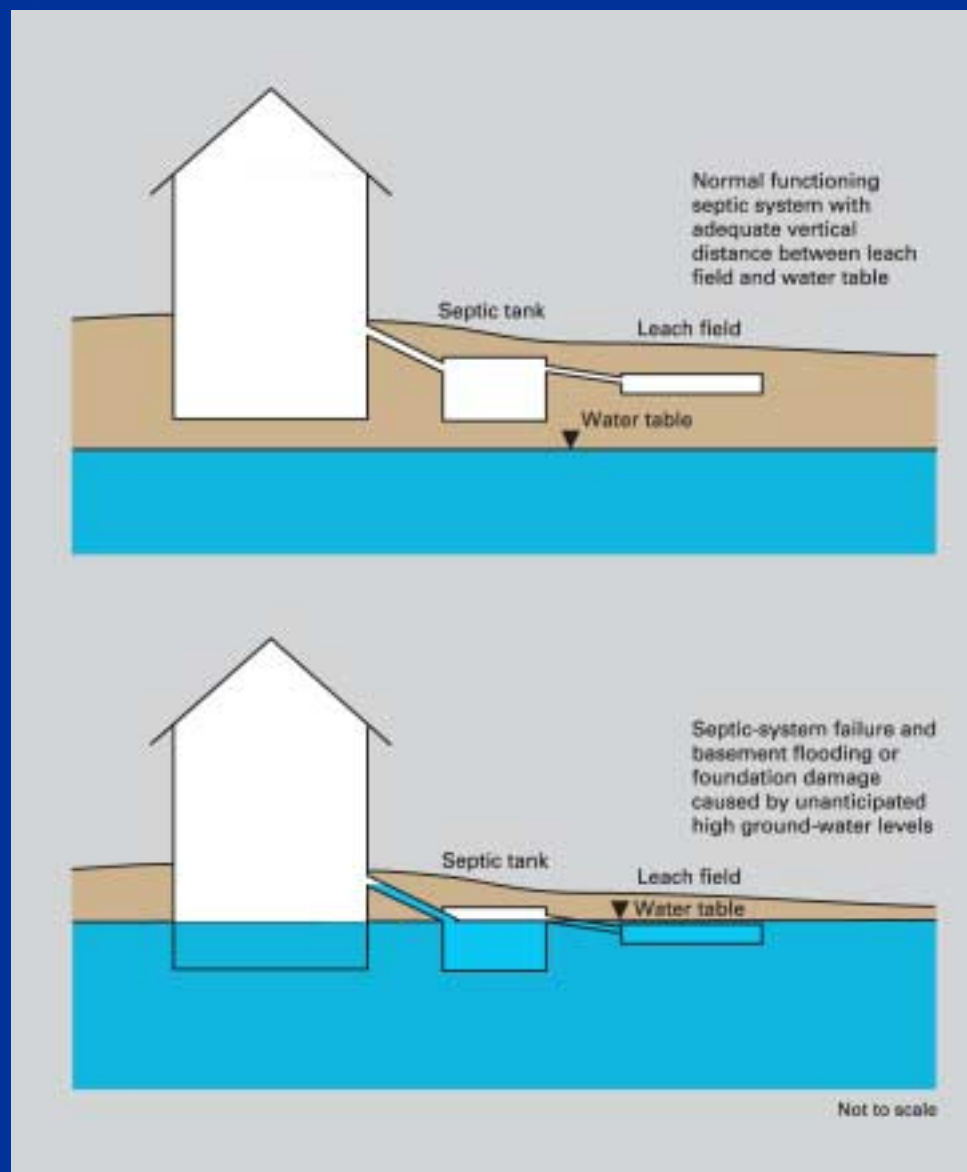




U.S. Geological Survey  
Climatic-Response Network Wells  
1999



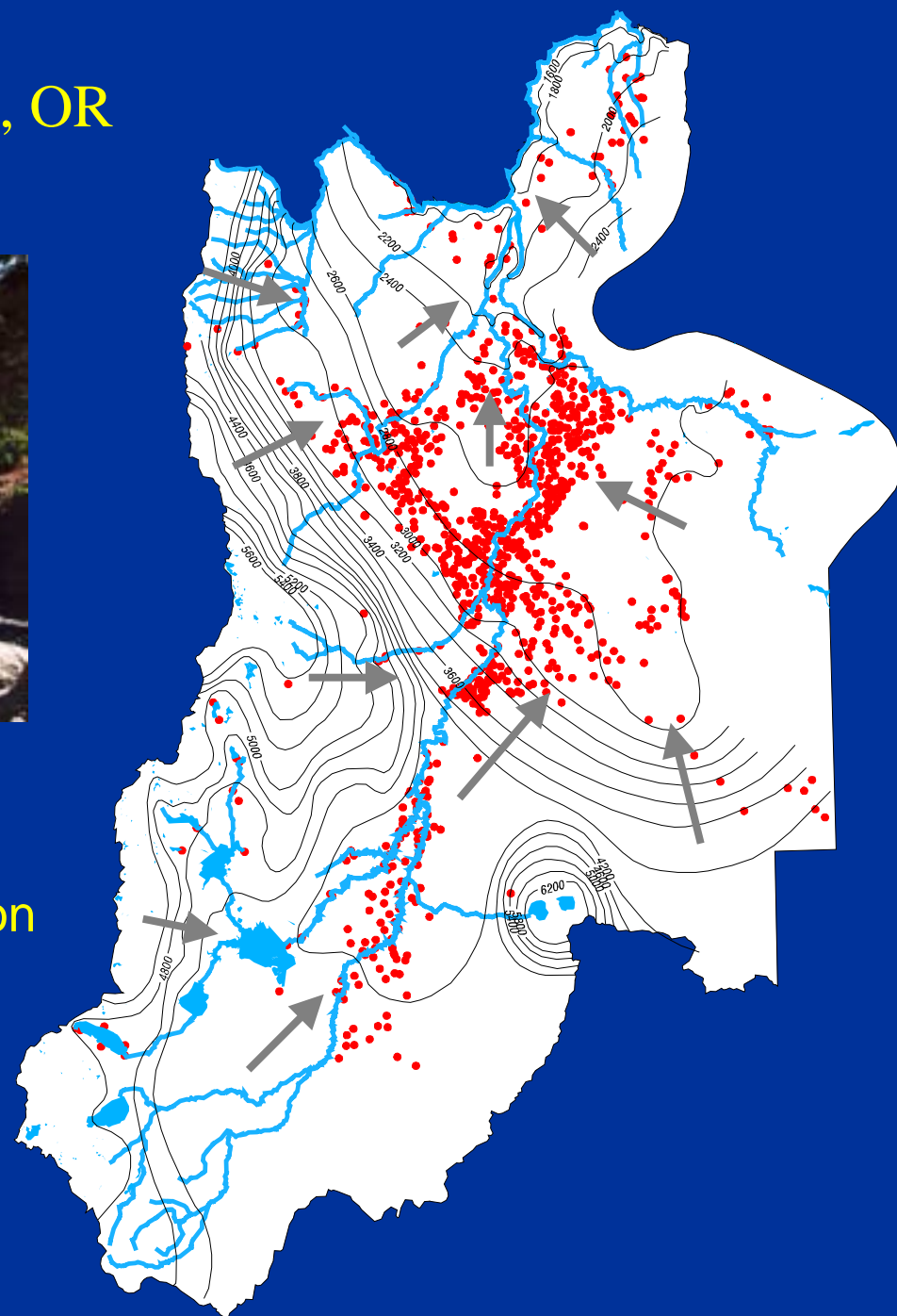
# High Ground-Water Levels in MA and RI



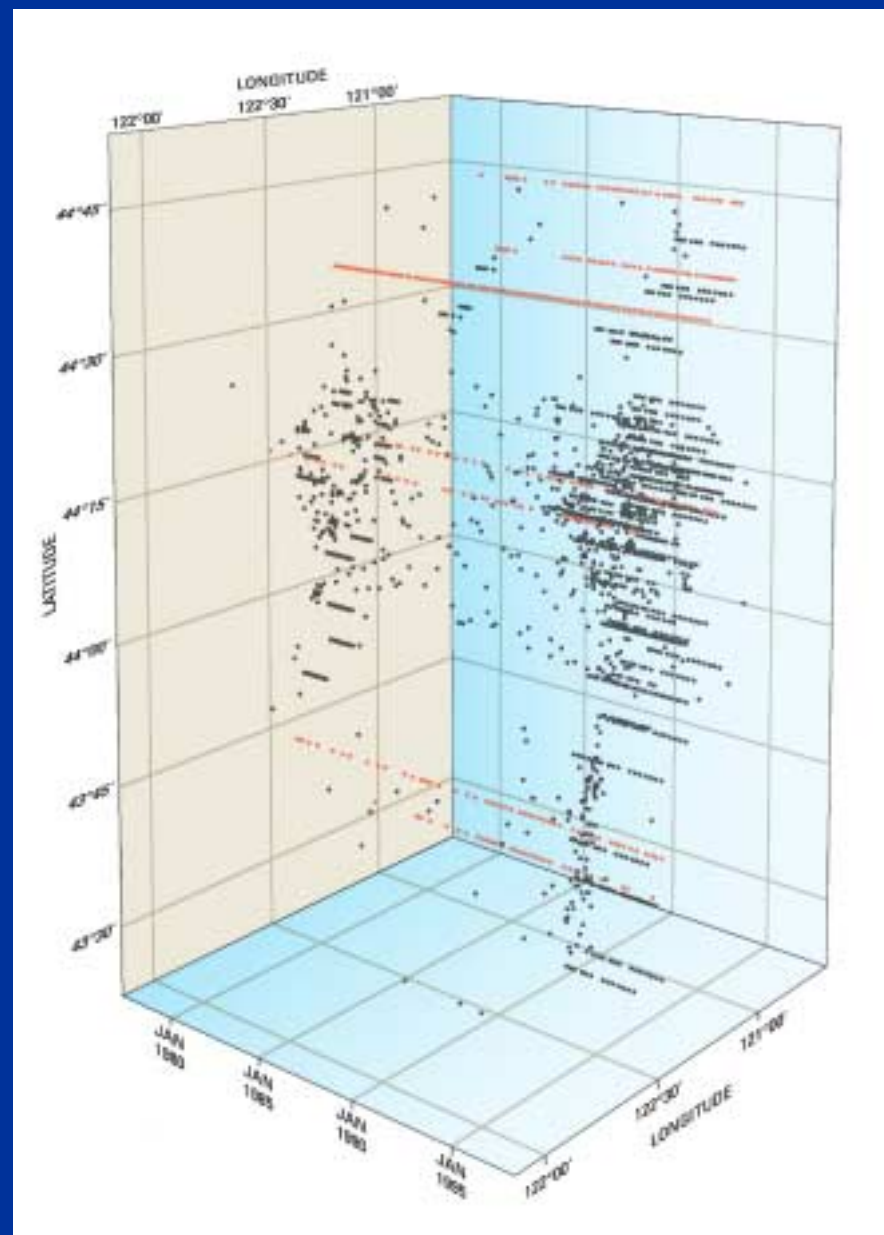
# Upper Deschutes Basin, OR



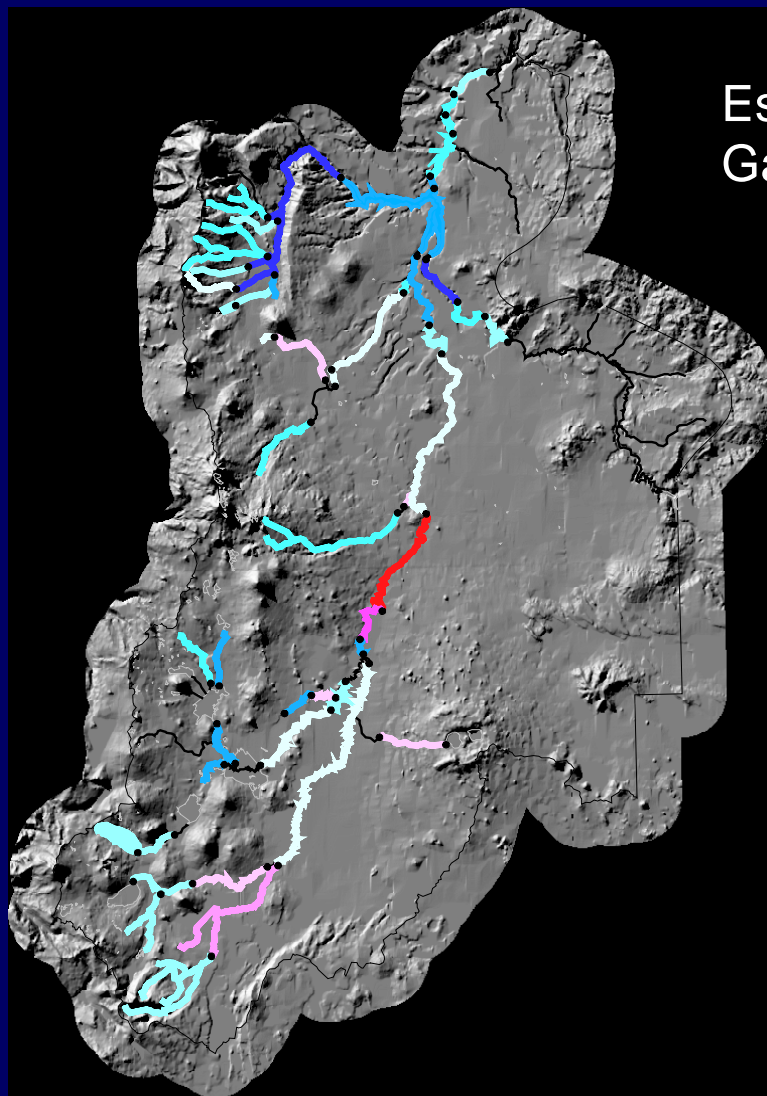
Arrows show approximate direction  
of regional ground-water flow





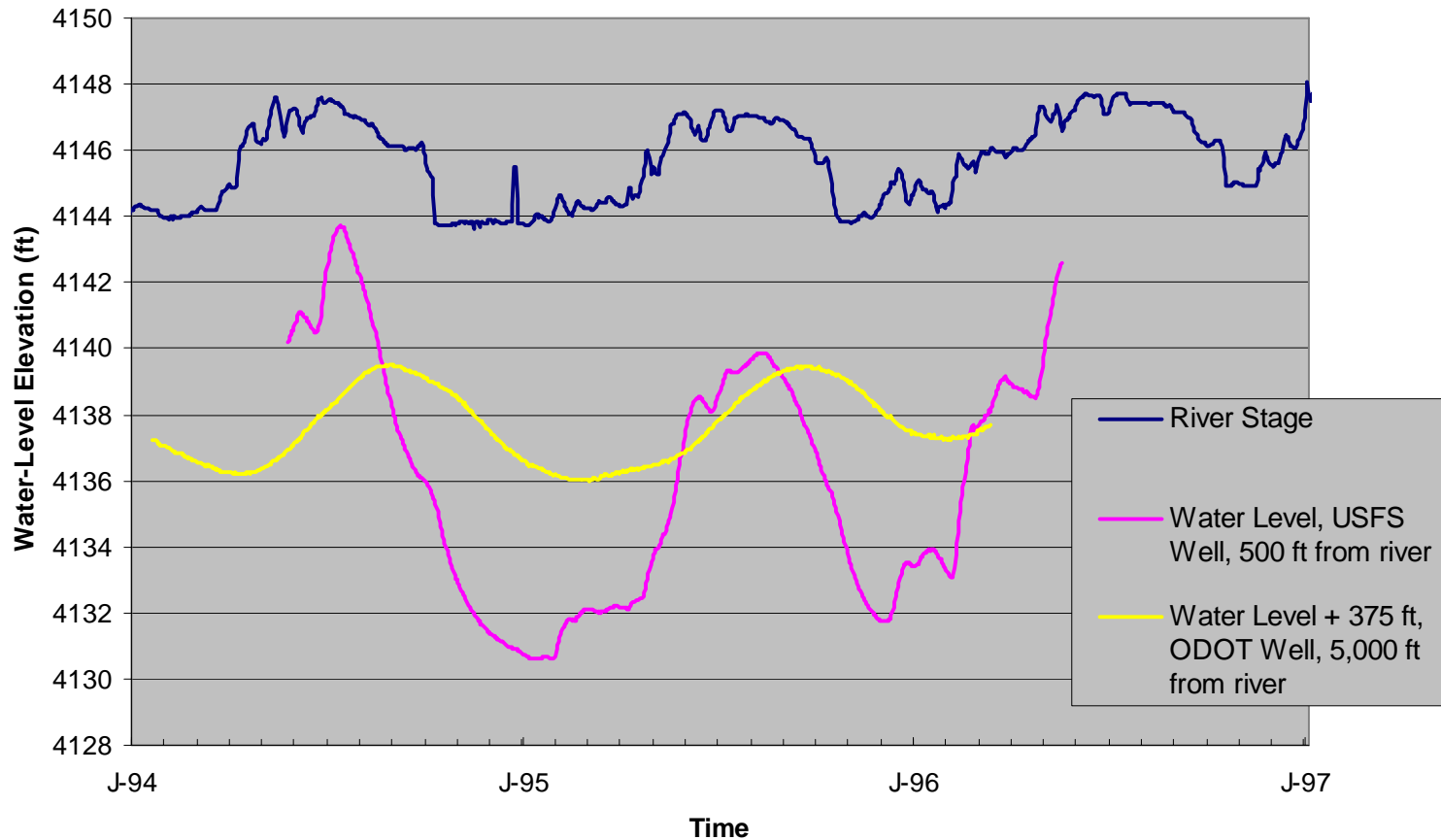


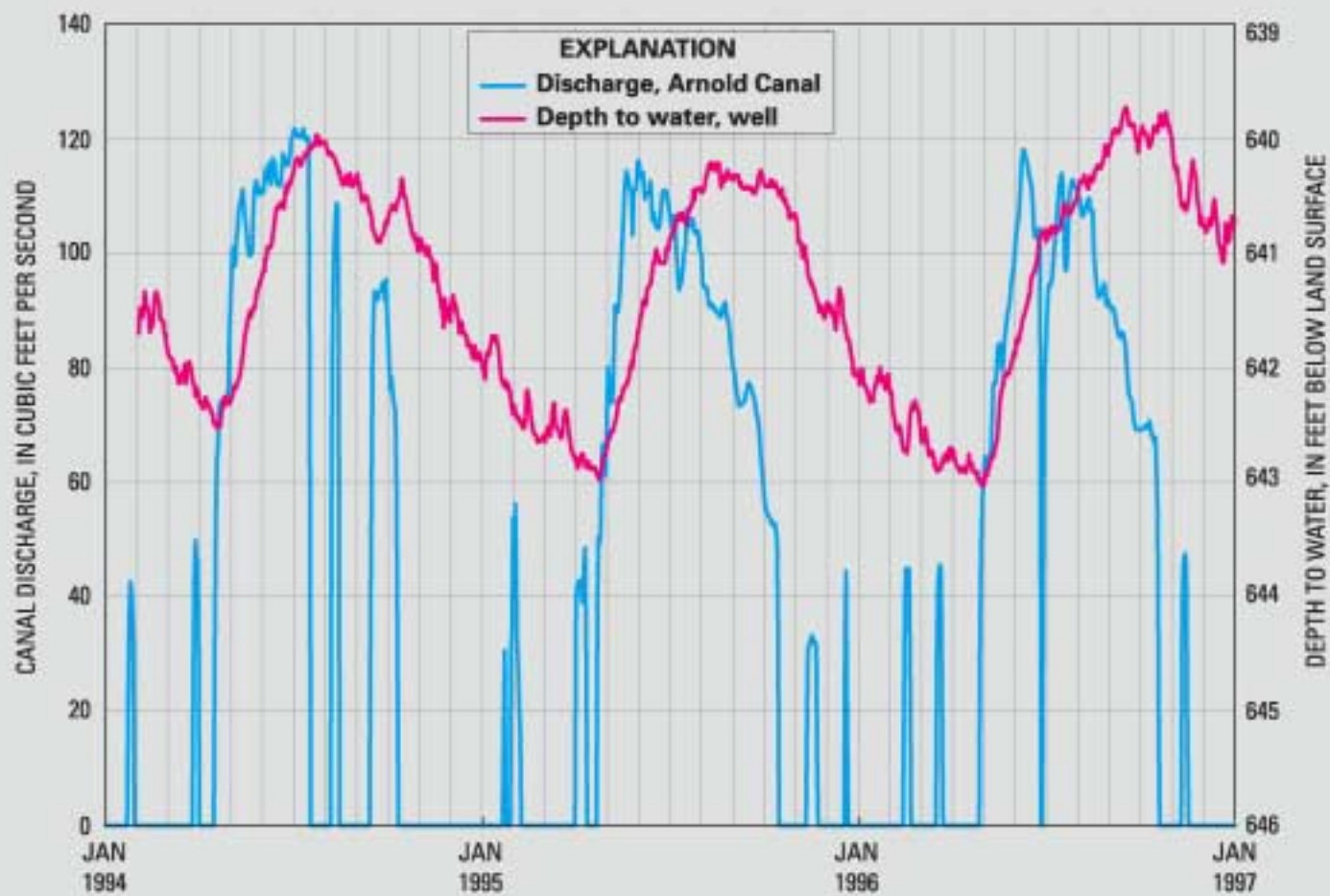
## Estimated Stream Gains and Losses



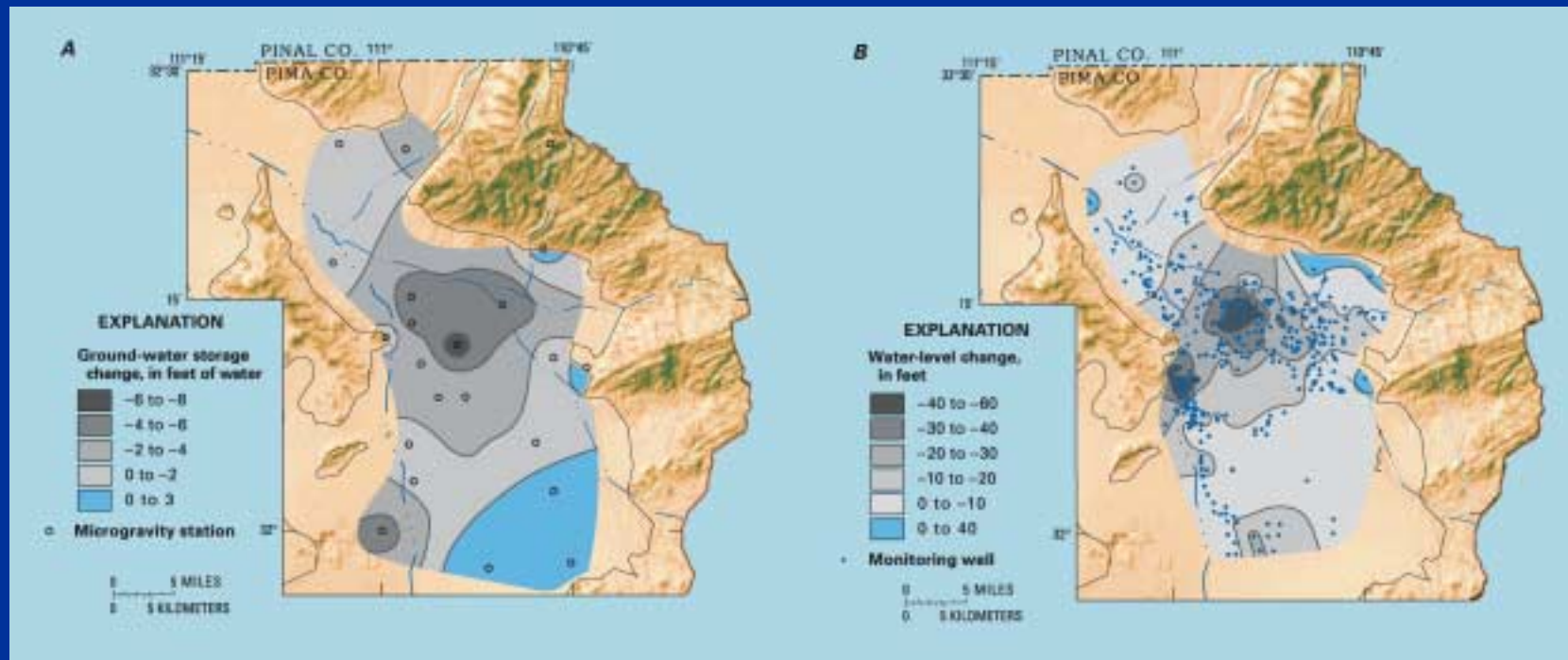
- > 500 cfs gain
- 100 to 500 cfs gain
- 50 to 100 cfs gain
- 10 to 50 cfs gain
- 0 to 10 cfs gain
- 0 to 10 cfs loss
- 10 to 20 cfs loss
- 20 to 50 cfs loss
- 50 to 100 cfs loss
- Measurement endpoint

## River Stage and Ground-Water Levels



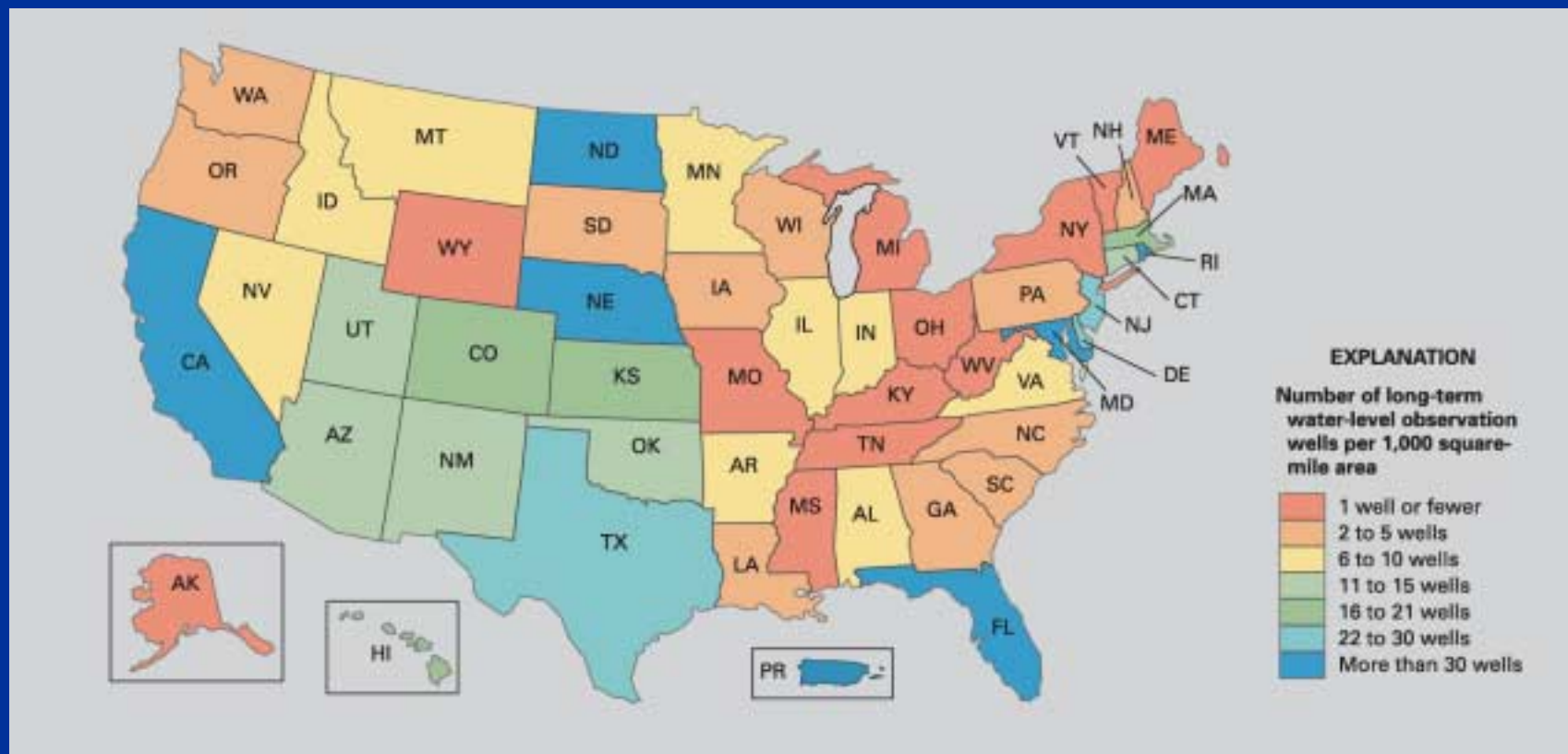


## Pima County (Tucson), AZ





# Long-term Water-level Monitoring in the U.S.



# Future Needs and Directions



# Integrated National Aquifer Data

References and Abstracts



*EPA Sole Source  
Aquifer Program*

Site Data

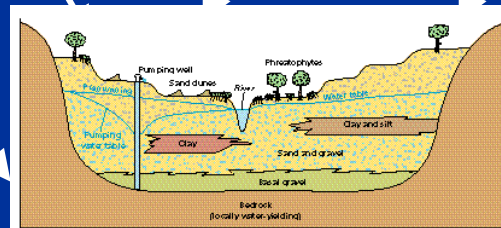
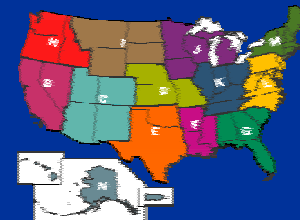
- Water levels
- Water quality
- Real time data
- Water use



**National Geologic Map Database**

**GEOLEX**

**Ground  
Water Atlas**



**Aquifer database**



**“The program should cover the water-bearing formations in all sections of the country; it should include beds with water-table conditions, deep artesian aquifers, and intermediate sources; moreover, it should include areas of heavy withdrawal by pumping or artesian flow, areas which are not affected by heavy withdrawal but in which the natural conditions of intake and discharge have been affected by deforestation or breaking up of prairie land, and, so far as possible, areas that still have primeval conditions. This nationwide program should furnish a reliable basis for periodic inventories of the ground-water resources, in order that adequate provision may be made for our future water supplies.”**

**O.E. Meinzer, 1935**